8.1 Comparing & Interpreting Rates

Comparing and Interpreting Rates [8.1]

Warm up:

Compare different pay scales. Decide if it is better to receive $300 a week or to be paid hourly at a rate of $7.50 per hour.

What factors could affect your decision?

$300 ÷ $7.50/hr = 40 hrs

40 hrs × $7.50/hr = $300

- how many hours you work in a week
- speed you work at

Help me decide:

Orange juice is sold in 1.5L cartons and 250ml boxes. A 1.5L caton sells for $3.75, and ten 250ml boxes sell for $7.39.

Which option is a better deal? (ie. Which size costs less per millilitre?)

1000ml = 1 l

→ 1.5 l × 1000ml/l = 1500 ml → $3.75

→ 10 × 250ml = 2500 ml → $7.39

Per unit cost

carton

cost/quantity = $3.75/1500ml = $0.0025/ml

250ml boxes

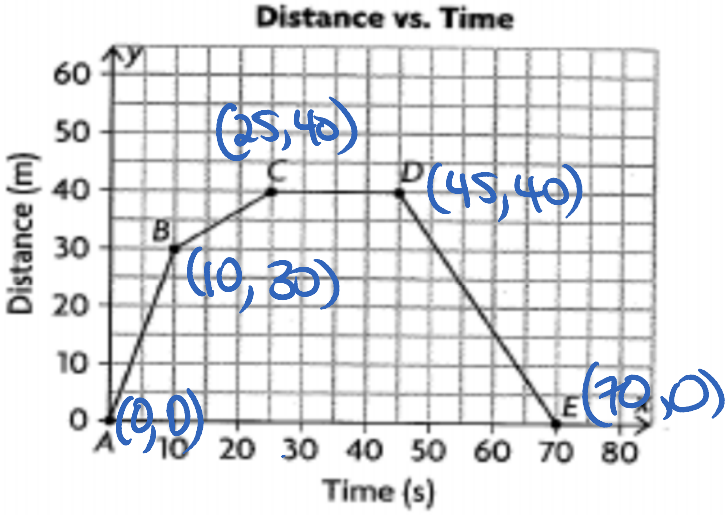
$7.39/2500ml = 0.00295/ml

less expensive

quantity 150ml | 70ml | 250ml

less expensive option

Tell me a story about this:



What do you remember about slope?

$m = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$

- rate of increase/decline...
- change of rates → acceleration → on diff sections of graph.

Looking back at the graph: $\overline{AB}, \overline{BC}, \overline{CD}, \overline{DE}$

- compare the rates that correspond to each line segment
- With a partner, discuss why the rates may have changed

pts A(0,0) B(10, 30) C(25,40) D(45,40) E(70,0)

slopes $m_{AB} = \frac{30\text{m} - 0\text{m}}{10\text{s} - 0\text{s}} = 3\text{m/s}$

$m_{CD} = \frac{(40-40)\text{m}}{(45-25)\text{s}} = 0\text{m/s}$

$m_{BC} = \frac{40\text{m} - 30\text{m}}{25\text{s} - 10\text{s}} = \frac{10\text{m}}{15\text{s}} = 0.67\text{m/s}$

$m_{DE} = \frac{0 - 40}{70 - 45} = \frac{-40}{25} = -1.6\text{m/s}$

↑ negative slope

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Practice pg 458 # 4, 7, 9, 12, 13, 14

(14)

1990) 5 yrs 103) 24 ← $\frac{24}{5}$ = 4.8 m Ton/yr

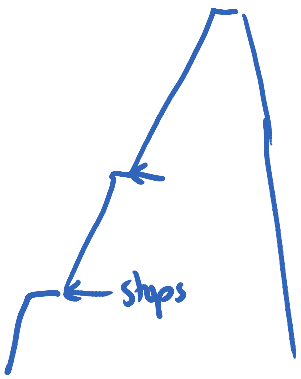
95) 5 yrs 127) 24 ←

2000) 3 yrs 151) 10 $\frac{10}{3}$ = 3.3 m Ton/yr

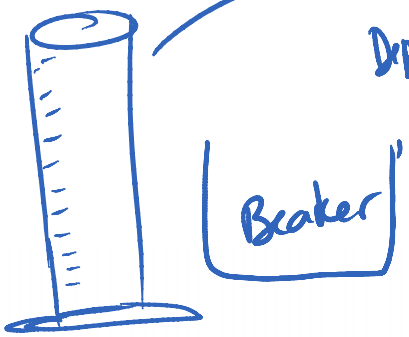
2003) 3 yrs 161) -3

2006) 3 yrs 158 ←

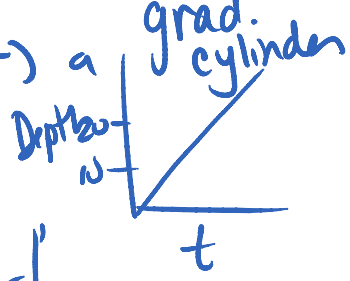
12



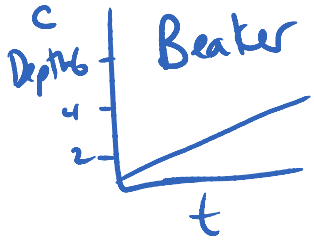
(13)



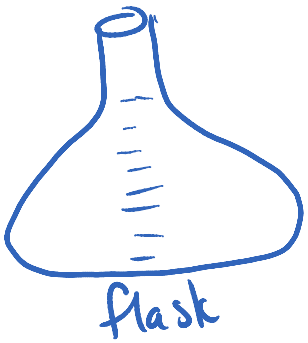
a

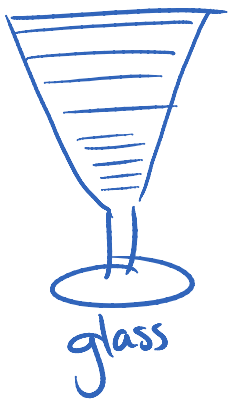


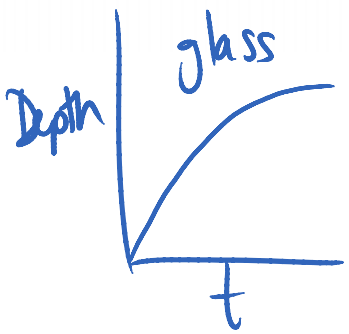
c



Do your HOMEWORK!








glass

Foundations 11 Unit 7: Lesson 2

Solving Problems that Involve Rates [8.2]

Getting started with a partner:

Which leg of his trip was his fuel efficiency best?

The gas tank of Mario's new car has a capacity of 55L. The owner's manual claims that the fuel efficiency of Mario's car is 7.6L/100km on the highway. Before Mario's first big highway trip, he set his trip to 0km so he could keep track of the total distance he drove. He started with the gas tank full. Each time he stopped to fill up the tank, he recorded the distance he had driven and the amount of gas purchased.

Fill-up	Total Distance Drive (km)	Quantity of Gas Purchased (L)
1	645	48.0
2	1037	32.1

$1037 - 645 = 392$

① $\frac{\text{fuel}}{d} = \frac{48\,l}{645\,km} = 0.0744\,\frac{l}{km} \times \frac{100\,km}{100\,km} = \frac{7.4\,l}{100\,km}$ better fuel efficiency

② $\frac{\text{fuel}}{d} = \frac{32.1\,l}{392\,km} = 0.0819\,\frac{l}{km} \times \frac{100\,km}{100\,km} = \frac{8.2\,l}{100\,km}$

other way

① $\frac{\text{dist}}{\text{fuel}} = \frac{645\,km}{48\,l} = 13.44\,km/l$

② $\frac{392\,km}{32.1\,l} = 12.21\,km/l$

Trust me… this will really happen to you:

[Insert your name here ☺] wants to defrost a frozen turkey in the microwave. The turkey has a mass of 4.23 kg. A website claims it takes 21 minutes to defrost 3 lbs of meat. ** 1 kg = 2.2 lbs **

How long, to the nearest minute, should you set the timer on defrost for?

kg → lbs

$4.23\text{kg} \times \frac{2.2\text{lbs}}{1\text{kg}} = 9.306\text{ lbs}$

lbs → min

$9.306\text{lbs} \times \frac{21\text{min}}{3\text{lbs}} = 65\text{ min}$

Bob burns 620 calories in a cardio kick box class lasting 2h, and 120 calories in a body sculpt class lasting 30 min. If he does cardio kick box for 3 hours, how much longer would he have to do body sculpt to burn the same number of calories?

rates

boxing $\frac{620\text{cal}}{2\text{hrs}} = \frac{310\text{cal}}{1\text{hr}}$ sculpt $\frac{120\text{cal}}{0.5\text{hr}} = \frac{240\text{cal}}{\text{h}}$

if he boxes for $3\text{hrs} \times \frac{310\text{cal}}{1\text{hr}} = 930\text{cal}$ burned

so how long would he need to sculpt to burn 930cal?

$\frac{930\text{cal}}{240\text{cal/hr}} = 3.875\text{hrs}$

∴ 0.875 hrs longer sculpting than boxing to burn same # of calories

∴ how much longer

$3.875\text{hrs}_{\text{sculpt}} - 3\text{hrs}_{\text{boxing}} = 0.875\text{hrs}$

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nm